REMARKS

Claims 23-25 and 27-44 are presently pending in this application. Claim 26 has been cancelled, without prejudice. Claims 34-42 have been withdrawn by the Examiner as being drawn to a non-elected invention.

Claim 23 has been amended to provide that the composite material is produced by thermoplastic processing techniques. This amendment is supported in the specification at page 2, lines 1-3.

New claim 44 is supported at page 15, lines 32-33, page 16, lines 1-17, page 17, lines 1-38 and by Example 1.2 of the specification.

No new matter has been added to the application by the foregoing amendments. Applicants respectfully request that these amendments be entered into the file record and considered by the Examiner, as it is believed that these amendments place the application in condition for allowance or in better form for appeal.

Claims 23, 24, 30-33, and 43 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Rätzsch et al. (WO 03/046053) in view of Grigo et al. (U.S. Patent No. 4,232,132). (NOTE: U.S. Patent No. 7,173,104 is being used as an English language equivalent of WO 03/046053).

With respect to claim 23: Rätzsch et al. allegedly teaches a composite material (Example 5) comprising up to 300% by weight of wood fibers/particles (col. 5, lines 32-39) per 100% amine resins (col. 14, lines 26-44) and a triazine resin (col. 2, lines 37-58) that can be a melamine resin (col. 2, lines 20-36) that has been cured/cross-linked (col. 14, lines 26-40). Also, Rätzsch et al. allegedly teaches mixing the melamine ethers with ethylene vinyl acetate in a ratio of 2:1 by weight (Example 7).

The Office Action acknowledges that Rätzsch et al. does not teach partially crosslinking the ethylene vinyl acetate polymer. However, the Office Action alleges that Grigo et al. teaches using partially crosslinked ethylene vinyl acetate polymer (col. 1, lines 40-42) with a vinyl acetate content of from 30 to 50 (col. 1, lines 52-55) as an additive in a polymer mixture. Rätzsch et al. and Grigo et al. allegedly are analogous art as they are concerned with the same field of endeavor, namely polymer blends comprising ethylene vinyl acetate (EVA) additives.

The Office Action contends that it would have been obvious to a person of ordinary skill in the art at the time of invention to have used the partially crosslinked ethylene vinyl acetate polymer of Grigo et al. in the mixture of Rätzsch et al., and the motivation to do so would have been, as Grigo et al. allegedly suggests, that mixtures comprising crosslinked ethylene vinyl acetate polymers have higher notched impact strength than their un-crosslinked counterparts (col. 3, lines 4-9).

With respect to claim 24: Rätzsch et al. allegedly teaches the wood as being present in fibers or flour (col. 5, lines 19-39). With respect to claims 30 and 31: Rätzsch et al. allegedly teaches the material as being a foamed material, a profile or an injection molded article (abstract). With respect to claim 32: Rätzsch et al. allegedly teaches the linking groups as being other than the excluded group (col. 2, line 58 – col. 3, line 10) and the hydroxyl groups as being exclusively etherified with C_1-C_{18} alkyl groups (col. 3, lines 52-54). With respect to claim 33: Rätzsch et al. allegedly teaches the thermoplastic as being ethylene-vinyl acetate copolymers, polyurethane polymers, or aliphatic or aromatic polyesters (col. 5, line 40 – col. 6, line 55). With respect to claim 43: Rätzsch et al. teaches a roof element comprising the composite material (col. 16, line 59- col. 17, line 10).

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

As reiterated by the Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, 82 U.S.P.Q.2d 1385 (2007), the framework for the objective analysis for determining obviousness under 35 U.S.C. §103 is stated in *Graham v. John Deere*. Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg., No. 195 (October 10, 2007) at page 57527 (hereinafter "Examination Guidelines"). The factual inquiries enunciated by the Court are as follows:

(1) Determining the scope and content of the prior art;

(2) Ascertaining the differences between the claimed invention and the prior art; and

(3) Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines at page 57527.

Claim 23 provides a composite material produced by thermoplastic processing

techniques with a proportion of wood and with a proportion of crosslinked plastics, the composition comprising from 55 to 90% by weight of wood and from 45 to 10% by weight of crosslinked plastics, where the proportion of wood has been dispersed in the form of particles in the crosslinked plastics, and the crosslinked plastics are mixtures comprising partially crosslinked ethylene-vinyl acetate copolymers whose vinyl acetate content is from 25 to 40% by weight and crosslinked melamine resin ethers in a mixing ratio of from 2:1 to 1:5.

New claim 44 provides a composite material comprising from 55% to 90% by weight of wood particles dispersed in 10% to 45% by weight of crosslinked plastic, the crosslinked plastic comprising (1) partially crosslinked ethylene-vinyl acetate copolymer having a vinyl acetate content of from 25% to 40% by weight; and (2) melamine resin ether in a mixing ratio of 2:1 to 1:5, wherein the composite material is prepared from a composition comprising: (a) wood particles; (b) ethylene vinyl acetate copolymer; (c) crosslinking agent; and (d) melamine resin ether.

Rätzsch et al. describes products of polymers containing triazine segments which are synthesized from mixtures of meltable 4- to 18- ring oligotriazine ethers. The products can contain up to 50% by weight of reactive polymers, e.g., saponified ethylene vinyl acetate copolymers (col. 5, lines 43- 44 of the U.S. document) and up to 75% by weight of fillers and/or reinforcing fibers, e.g., wood fibers (col. 5, lines 36-37 of the U.S. document).

Rätzsch et al. does **not** relate to a composite material comprising wood and crosslinked plastics with mixtures of **partially crosslinked** ethylene-vinyl acetate copolymers whose vinyl acetate content is from 25 to 40% by weight and of crosslinked melamine resin ethers in a mixing ratio of from 2:1 to 1:5, as is presently claimed.

The basic difference between the teaching of Rätzsch et al. and the present invention exist in the use of saponified, e.g., mainly linear ethylene vinyl acetate copolymers according to Rätzsch et al. vs. partially crosslinked ethylene-vinyl acetate copolymers according to the present invention.

Grigo et al. relates to a thermoplastic mixture comprising (A) 40-95 wt% polypropylene and (B) 5 to 60 wt% of a partially cross-linked ethylene/vinyl acetate copolymer (col. 1, lines 37-42). The addition of partially crosslinked copolymers improves

the elastic properties, particularly notched impact strength and permanent elongation (col. 1, lines 27-36).

According to Grigo et al., it is important that the partial crosslinking of the EVA-copolymer be carried out *before* mixing with the polyolefin in order to prevent the polyolefin being degraded by the crosslinking agents, e.g., epoxides (col. 2, lines 17-21). The partial crosslinking of the EVA-copolymer is carried out in bulk and before mixing with the polyolefin (col. 2, lines 15 to 21, and lines 60 to 65).

The present invention, however, refers to a composite material produced by *thermoplastic processing techniques* comprising wood and mixtures of melamine resin ethers and partially crosslinked EVA-copolymers. Thus, the composite material is a duroplastic plastic-wood-composite with partially crosslinked EVA-copolymers.

The production process of the composite material comprises the synthesis of the melamine resin ether followed by mixing and compounding said melamine resin ether with wood particles, non-crosslinked EVA-copolymer and a crosslinking agent e.g., di-(tert. butylperoxyisopropyl)benzene at 130°C (see Example 1.2 of the filed application). This temperature is below the temperature required for crosslinking the EVA-copolymer. Only after molding is the composite cured at temperatures above 150°C with a concomitant crosslinking of the EVA-copolymer (see Example 1.2).

Thus, the melamine resin ether is mixed with the non-crosslinked EVA-copolymer; the crosslinking of the EVA-copolymers occurs only at a later process stage. The partially crosslinked EVA-copolymer is only present in the final composite material.

Only the addition of non-crosslinking EVA-copolymers to the melamine resin ether and wood particles allows for obtaining the composite material by thermoplastic processing techniques. The application of non-crosslinked EVA-copolymer before molding and curing influences the flow properties (rheological properties) of the melamine resin-wood-molding material. In this context it is important that the melamine resin-wood-molding material only exhibits thermoplastic behavior before curing and crosslinking of the duroplast at temperatures above 150°C. By adding non-crosslinked EVA-copolymer the flow properties of the molding material are improved and thus the compounding step of the duroplastic material is alleviated.

Grigo et al., on the other hand, teaches that a crosslinked EVA-copolymer is admixed with a thermoplastic polyolefin.

By applying the teaching of Grigo et al. in an attempt to obtain the present composite material, a person skilled in the art would therefore add partially crosslinked EVA-copolymer to a melamine resin ether - wood - mixture, melt and homogenize said mixture at temperatures between 230 to 250°C (col. 3, line 35 to 45 of Grigo et al.). However, this approach would provide for a duroplastic mixture which immediately is cured and hardened making a further molding process of the material simply impossible. In other words, adding already partially crosslinked EVA-copolymer to the melamine resin ether-wood-mixture has a strong negative effect and decreases the flow properties of the mixture. The composite material would not be producible by thermoplastic processing techniques. Thus, Grigo et al. teaches away from the present invention.

Also, by combining the teaching by Rätzsch et al. and Grigo et al., a person of ordinary skill in the art would not arrive at the present invention, but at most would end up adding already crosslinked EVA-copolymer (Grigo et al.) to aminotriazine ether (Rätzsch et al.). Such a mixture would immediately harden and not be applicable to any thermoplastic processing techniques as described above.

Beside the fact that a non-crosslinked EVA-copolymer is compounded together with the melamine resin ether and wood particles in the present invention, it is also important to note that a crosslinking agent is added with the non-crosslinked EVA-copolymer. The crosslinking agent promotes the curing or crosslinking of the EVA-copolymer at temperatures above 150°C.

The addition of non-crosslinked EVA-copolymer in the absence of a crosslinking agent would improve the flow properties of the resin-wood-mixture. However, the mechanical properties of the duroplastic resin-wood-composite would be reduced due to the missing formation of partially crosslinked EVA-copolymers and the affiliated interpenetrating network. This is, of course, a disadvantage. The surprising solution of the present invention lies within the fact that the near-simultaneous addition of crosslinking agent and non-crosslinked EVA-copolymer improves the flow-properties of the resin-wood-mixture during the processing steps and at the same time does not reduce the mechanical properties of

the mixture due to the formation of partially crosslinked EVA-copolymer in the final composite material.

This solution is not suggested by Grigo et al. According to Grigo et al., the thermoplastic mixtures are obtained by simply mixing partially crosslinked EVA-copolymers and with thermoplastic polyolefin at temperatures between 230 and 250°C (see Examples in column 3 of Grigo et al.). In contrast, the present composite material is obtained by a more complex process: compounding wood, melamine resin ether, non-crosslinked EVA-copolymer and crosslinking agent at 130°C, followed by moulding at the same temperature, and final curing (crosslinking) at increased temperatures above 150°C.

These differences are mainly based on the fact that Grigo et al. relates to a thermoplastic mixture and the present composite relates to a duroplastic mixture. A duroplastic material exhibits thermoplastic properties only during a very restricted time and temperature window. After curing (crosslinking) of the duroplastic resin-wood-mixture the obtained duroplastic composite material is not appreciably mechanically or thermally deformable and does not exhibit any elastic properties. This is even intensified by the partially crosslinked EVA-copolymer.

Thermoplastic material as taught by Grigo et al., on the other hand, is characterized by its elastic properties. According to Grigo et al., the addition of partially crosslinked EVA-copolymers improves the elastic properties of the thermoplastic mixture (col. 1, lines 27-34). Thus, a typical property of thermoplastics is improved.

Since duroplasts do not exhibit any elastic property by definition, a person skilled in the art would not apply the teaching of Grigo et al. to the area of duroplasts, as in the present case.

Thus, the present composite material is not obvious over Rätzsch et al. in view of Grigo et al. Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

Claim 25 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Rätzsch et al. in view of Grigo et al. as applied to claim 23 above, and further in view of Imoto (U.S. Patent No. 5,780,519). With respect to claim 25: Rätzsch et al. allegedly teaches the composite of claim 23 as shown above, and also teaches the wood as being used up 75%

of the composite (col. 14, lines 26-44). The Office Action acknowledges that Rätzsch et al. does not teach the wood as being a combination of fibers and shavings. However, Imoto allegedly teaches using a combination of fibrous wood and wood shavings in a wood composite material (col. 1, lines 53-56 and col. 2, lines 54-56), wherein the shavings are present in an amount of at least 50 percent of the wood material (col. 7, lines 41-43). Rätzsch et al. and Imoto allegedly are combinable as they are concerned with the same field of endeavor, namely lignocellulosic composites. The Office Action contends that it would have been obvious to a person having ordinary skill in the art at the time of invention to have used the combination of wood fillers of Imoto in the composite of Rätzsch et al., and the motivation to do so would have been, as Imoto suggests, it will lower the cost of the composite (col. 7, line 41 - col. 8, line 3).

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

Imoto describes moulding products comprising at least four components:

- lignocellulose in form of powder, granulate or fibers (col. 2, lines 55-56),

- water soluble polymers with at least two OH-groups, a tensile strength of 10-300 MPa and a surface tension of 30-65 mN/m used for even distribution of air bubbles in the moulding (col. 3, lines 1-5),

- water soluble polymers with at least two carboxyl groups used for even distribution of adhesives in the moulding (col. 3, lines 56-64), and

- polymers with a tensile strength of 0.1-10 MPa, an elongation of 200 to 2000% and a cohesion energy density of 3 0-200 cal/cc, e.g., ethylene-vinyl acetate copolymer (col. 4, line 4-10) used as adhesives.

An object of Imoto is to provide a homogenous lignocellulose containing moulding product and, thus, to prevent the migration of adhesives to the surface of the mouldings during the production process. This is achieved by using water soluble polymers with at least two carboxyl groups and at least two OH-groups.

Imoto does not suggest or disclose the use of a partially crosslinked ethylene-vinyl acetate copolymer. This fact can be concluded from the result of the comparative example 1 (col. 7, lines 9-17). By leaving out the water soluble maleic anhydride copolymer

(ISOBAM-104) which is used for the even distribution of the adhesive in the moulding, the adhesive ethylene-vinyl acetate copolymer migrates to the surface. Such a migration of the ethylene-vinyl acetate copolymer can only take place if said copolymer is present in a linear form in the moulding and not in a crosslinked network.

Imoto also does not teach the use of crosslinked melamine resin ether.

A combination of the teachings of Rätzsch et al. and Grigo et al. (discussed above) and Imoto would, at most, lead to a moulding material comprising aminotriazine resins, lignocellulose in form of wood fibres, partially crosslinked ethylene-vinyl acetate copolymer as adhesive and water soluble polymers with two OH- or carboxyl groups.

By doing so, a person skilled in the art would by no means arrive at a composite material comprising crosslinked melamine resin ethers and partially crosslinked ethylene-vinyl acetate copolymers produced by thermoplastic processing techniques according to amended claim 23. With respect to new claim 44, the composite material is prepared from a composition comprising: wood particles; ethylene vinyl acetate copolymer; crosslinking agent; and melamine resin ether. As discussed above, the ethylene vinyl acetate copolymer is partially crosslinked by the crosslinking agent in situ, which is not suggested by Rätzsch et al., Grigo et al. or Imoto.

Thus, the subject matter of claim 25 is not obvious over Rätzsch et al. and Grigo et al. in view of Imoto. Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

Claims 27-29 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Rätzsch et al. in view of Grigo et al. as applied to claim 23 above, and further in view of Medoff et al. (U.S. Patent No. 6,448,307). Rätzsch et al. allegedly teaches the composite of claim 23 as shown above and adding up to 2 weight percent of a UV absorber (col. 14, lines 40-42). The Office Action acknowledges that Rätzsch et al. does not teach adding a flame retardant, pigment, or auxiliary. However, Medoff et al. allegedly teaches adding a flame retardant, colorant/pigment or lubricant (col. 6:20-28) to a melamine-wood composite. Rätzsch et al. and Medoff et al. allegedly are combinable as they are concerned with the same field of endeavor, namely melamine-wood composites. The Office Action contends that it would have been obvious to a person having ordinary skill in the art at

the time of invention to have added the components of Medoff et al. to the composite of Rätzsch et al., and the motivation to do so would have been, as Medoff et al. suggests, these are well known additives in thermosetting compositions (col. 6, lines 20-28).

The Office Action acknowledges that Rätzsch et al. does not teach the flame retardant, pigment, or auxiliary as being added in the claimed amounts. However, the Office Action contends that it is well known in the art to optimize result effective variables such as ingredient amount, and that it would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the amounts of the components through routine optimization, and the motivation to do so would have been to increase the fire resistance, provide the desired colored product, and to increase the processability respectively.

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

Rätzsch et al. and Grigo et al. do not suggest the present composite material, as discussed in detail above.

Medoff et al. describes compositions obtained by mixing cellulosic and/or lignocellulosic fibers with different matrix materials, e.g. resins, elastomers, asphalts, tar or lignins. Useful fibers include paper and paper products, products made of hemp, flax, corn, coconut or wood (col. 4, lines 26-34). Further additives might be included like flame retardants, pigments or stabilizers (col. 6, lines 21-29).

Medoff et al. does not suggest or disclose the use of ethylene-vinyl acetate copolymers and crosslinking agents or crosslinked melamine resin ethers according to amended claim 23, and, thus, does not cure the deficiencies of Rätzsch et al. and Grigo et al.

The composition according to Medoff et al. comprises a network of fibers encapsulated within a matrix. The fibers are thought to form a lattice network, which provides the composition with strength. The bonding of the polymers to the fibers is increased due to the texturized surface of the fibers (col. 4, lines 57-64).

Thus, the use of crosslinked polymers is not required since the fibers do provide the necessary strength by forming a network.

The strength of the present composite material, however, is provided by the

crosslinked melamine resin and the partially crosslinking of ethylene-vinyl acetate copolymer in situ. The wood is incorporated into this network.

By combining the teachings of Rätzsch et al., Grigo et al. and Medoff et al., a person skilled in the art would arrive, at the most, at a composition based on a network of texturized cellulosic fibers in which aminotriazine polymers, partially crosslinked ethylene-vinyl acetate copolymer, and further additives are mixed. Such a combination would not provide the composite material according to amended claim 23. Thus, the subject of amended claim 23 and new claim 44 is also not obvious over Rätzsch et al. and Grigo et al. in view of Medoff et al. Claims 27-29, which depend from claim 23, are distinguishable from Rätzsch et al. in view of Medoff et al. for the same reasons as set forth above for claim 23. Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

In view of the remarks above, reconsideration and withdrawal of the rejections and favorable allowance of all claims is respectfully requested.

Respectfully submitted,

THE WEBB LAW FIRM

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Ann M. Cannoni
Registration No. 35,972
Attorney for Applicants
436 Seventh Avenue
700 Koppers Building
Pittsburgh, PA 15219
Telephone: (412) 471-8815
Facsimile: (412) 471-4094
E-mail: webblaw@webblaw.com